

treatment of horse manure, so as to reduce to a minimum the number of house flies. Practical inferences to be drawn from this important investigation are that house flies, which occur everywhere and have a remarkable capacity for flying or being carried long distances in railway trains or other conveyances, are capable of carrying the germs of fatal diseases from place to place, and are therefore a source of great danger. In view of this, steps should be taken to restrict as much as possible their opportunities for breeding, by rendering their favourite habitats unsuitable for the purpose. To this end all such exposed matter in which they could breed should be removed or covered up as quickly as possible. Ashes, lime, or even dried earth, are usually easily obtainable, and will answer well for this last-mentioned purpose. Steps should be taken to prevent as much as possible the entry of flies into hospitals, houses, kitchens and pantries, by means of screens on doors and windows, and all flies found inside such protected buildings should be destroyed by a constant use of fly-papers or pyrethrum insect powder.

J. FLETCHER.

#### FOUR NEW SPECIES OF HIPPISCUS.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Since the publication, in *Psyche* for 1892, of my study of the Orthopteran genus *Hippiscus*, a few additional species have come to light, and they are herewith described. The first species belongs to the subgenus *Hippiscus*, the others to the subgenus *Xanthippus*.

*Hippiscus citrinus*, sp. nov.—A compact and stout though rather small form. Head rather stout and full, broad above, luteo-testaceous, more or less infuscated above, dark fuscous in a stripe behind the eyes, the carinæ more or less infuscated; summit of head obscurely punctate, the vertical scutellum obscure and, with the foveolæ, much as in *H. compactus*; frontal costa broad, flat, punctate, depressed at the ocellus, where it is slightly enlarged, but otherwise subequal; antennæ ferruginous in basal, blackish in apical half. Pronotum stout, somewhat constricted mesially and considerably expanded on the metazona, the disc nearly plane with rather heavy rugæ forming the scutellum of the prozona, the metazona nearly smooth, but with a few slight rugæ and granulations; median carina very uniform and not prominent, but on the metazona slightly arcuate as seen laterally; lateral canthi tolerably distinct on the metazona (but rounded posteriorly), considerably surpassing the median

sulcus; process of metazona feebly obtusangulate. Tegmina blackish fuscous with a heavy testaceous sutural stripe, and crossed at middle and beyond by a narrow pallid stripe, and at end of basal third by a cinereous patch, the apical fifth vitreous, crossed by a couple of blackish fuscous stripes; wings pale citron at base, hyaline apically, the sutural line luteous, with a broad, blackish fuliginous mesial band curving broadly around the outer margin to the anal angle, and in the humeral area sending a narrowing tænia half way to the base; it leaves the four upper lobes free at the margin, but the two upper are clouded apically; the last forked branch of the discoidal vein arises at the outer edge of the mesial band; hind legs much as in *H. compactus*.

Length of body, 25 mm.; tegmina, 25 mm.

1 ♂. Alabama; C. F. Baker; No. 1912.

The species is separated from *H. compactus* Scudd., to which it is most nearly allied, by the markings of the tegmina (in which the darker parts are much more extended) and in the surface structure of the pronotal disc.

*Hippiscus glaucipes*, sp. nov.—Dark fuscous, sometimes more or less ferruginous, of slender form and small size. Head not very large, dull fuscous above, elsewhere pale fusco-cinereous, occasionally pale ferruginous, dotted with obscure fuscous, the summit feebly granulate behind the fastigium, which is distinct, with sharply defined but not greatly elevated walls, almost as broad as long, divided in anterior half by a median carina, open posteriorly; lateral foveolæ distinct, subtriangular, longer than broad, the inferior margin arcuate, the superior straight, embracing with their tips a median foveola of similar size and depth, its margins arcuate above, straight beneath when clearly distinguished from the frontal costa, as especially in the male; frontal costa moderately broad, subequal but slightly contracted at the summit and below the ocellus, somewhat sulcate throughout. Pronotum compressed, a little expanded on the metazona, especially in the female, nearly plane above, but the metazona feebly convex in the female, the process rectangulate, the median carina slight, equal, straight, uninterrupted between the sulci, the lateral canthi distinct but confined to the metazona, the dorsal surface, especially of metazona, marked with short, slightly obliquely longitudinal, distinct rugæ, the prozona with a slight scutellum, the lateral lobes with a broad, distinctly retroarcuate curve posteriorly. Tegmina dark fuscous, darkest in basal third and at the middle, with a distinct and generally

broad testaceous sutural stripe, a testaceous or pallid patch beyond the middle, a cinereous patch midway between it and the base, and the outer third mostly pellucid with fuscous veins and more or less flecked with fuscous; wings pale citron on basal half, except where the humeral vitta runs in nearly to the base, blackish fuliginous beyond except for a pallid sutural stripe almost invariably present, the apex of the two uppermost lobes often more or less vitreous, generally not so dark as the rest of the outer half of the wing, the dark portion following the outer border to the anal angle. Hind femora cinereo-testaceous, the inferior carina and sulcus luteous, but otherwise often twice obliquely striped rather narrowly with fuscous; hind tibiæ glaucous or iuteo-glaucous, the spines black-tipped.

Length of body, ♂ 19 mm., ♀ 28.5 mm.; tegmina, ♂ 20.5 mm., ♀ 25 mm.

5 ♂, 3 ♀. Yosemite Valley, Cal., Aug. 11; between Nevada Falls and Cloud's Rest, Yosemite Valley, Cal., Aug. 12; A. P. Morse.

This species is most nearly related to *H. obscurus* Scudd., differing from it chiefly by the structure of the surface of the pronotal disc, the less prominent median carina, the narrower tegmina, the presence of a sutural stripe on tegmina and wings, and the colour of the hind tibiæ.

*Hippiscus validus*, sp. nov.—Fusco-griseous, rather robust and somewhat below the medium size. Head rather large, more or less cinereous, rather broad and not very tumid above, the summit subrugulose, carinulate throughout; fastigium of vertex moderately deep, polygonal, with sharp but not very high walls, the frontal fastigium deeply impressed, constricted anteriorly, margined in front and behind as distinctly as at the sides; frontal costa moderately broad, strongly constricted above, slightly narrowed below the ocellus, somewhat sulcate or at least depressed at the ocellus; antennæ shorter than the head and pronotum, apically blunt and in no way attenuate in the female, castaneous, more or less infuscated apically. Pronotum expanding considerably on the metazona, which is nearly plane but rugulose, the anterior portion without signs of transverse plications, the process rectangulate with crenulate margin, the median carina slight, not altogether obliterated between the sulci, the lateral canthi sharp and distinct on the metazona, obscure or wanting on the prozona excepting on extreme front, the posterior margin of the lateral lobes vertical and not retroarcuate. Tegmina broad and rather short, but little surpassing the abdomen, griseo-cinereous, with

profuse irregular fuscous mottlings irregularly distributed, the anal line of the lighter colour, but sometimes obscure, the intercalary vein arcuate only at extreme apex, subequidistant throughout (and not very distant) from the median vein, the lower intercalary area broad and rather densely filled with anastomosing nervules, but not more densely than the area beneath it, the axillary vein united apically with the anal. Wings bright red (or occasionally citron?) at base, vitreous at apex, with heavily infuscated veins, and an extramesial, strongly arcuate, transverse fuscous band, about half as broad as the tegmina, tapering a little along the hinder margin, failing to reach the anal angle and leaving three marginal lobes free at the apex; it sends a stout humeral vitta to the very base. Hind femora cinereous, twice banded very obliquely and not very broadly with fuscous, very broad, the inferior carina rather high and rather strongly arcuate, the inferior sulcus red; hind tibiæ red, paling basally, or luteous.

Length of body, 36 mm.; antennæ, 9 mm.; tegmina, 29 mm.; hind femora, 16 mm.

4 ♀. Blaine Co., Idaho, July 23; Mus. Leland Stanford Univ.

This species is closely related to *H. calthulus* (Sauss.), but differs from it in the sharper median carina and lateral canthi of the pronotum, the disc of which is less coarsely rugose; the transverse fuscous band of the hind wings is also narrower.

*Hippiscus croceus*, sp. nov.—Fusco-griseous, rather robust, and considerably below the medium size. Head moderate, pale cinereous excepting above, the summit gently tumid, transversely rugulose, feebly carinulate throughout; fastigium of vertex not deeply impressed, but with distinct walls, hexagonal, open behind, as broad as long, the front portion separated off by a low transverse ridge to form a divided frontal fastigium; frontal costa moderately broad, subequal, scarcely contracted either above or below the ocellus, moderately sulcate at and below the ocellus, punctate above; antennæ a little shorter than head and pronotum, apically blunt and scarcely attenuate on last two joints in the female, testaceous, apically infuscated. Pronotum expanding moderately on the metazona, the disc of which is faintly tumid with not very frequent short longitudinal rugæ throughout, the process rectangulate with rounded angle and subcrenulate margin, the prozona posteriorly impressed, transversely plicate, the median carina slight, percurrent, the lateral canthi distinct but not sharp, the posterior margin of the lateral lobes

vertical above, but faintly retroarcuate below. Tegmina broad and rather short, though surpassing considerably the abdomen, cinereous, thrice rather narrowly banded with clustered fuscous maculations, the apical third mostly obscurely hyaline, the intercalary vein straight, subequidistant between the median and ulnar veins, the lower intercalary area not very broad, similar in density of anastomosing veins to the area beneath it, the axillary vein free. Wings citron at base, vitreous at apex, with fuscous veins, crossed at and beyond the middle by a dark fusco-fuliginous band, as broad as the tegmina, including the hind margin and following it broadly to the anal angle; its outer margin on the spread wing is straight and a broad tænia in the humeral lobe runs almost to the base of the wing. Hind femora testaceous, thrice banded very obliquely and not very broadly with fuscous, broad, the inferior carina rather high and rather strongly arcuate, the inferior sulcus luteous; hind tibiæ luteous throughout.

Length of body, 25 mm.; antennæ, 9 mm.; tegmina, 27 mm.; hind femora, 14.5 mm.

2 ♀. Blaine Co., Idaho, July 23; Mus. Leland Stanford Univ.

This species belongs near the preceding species from the same district, and was collected on the same day. It differs in the sculpturing of the metazona and in the markings of the tegmina and wings. In the latter point it agrees fairly well with *H. montanus* (Thom.).

THE PROTECTIVE COLORATION AND ATTITUDE OF *LIBYTHEA CELTIS*, Esp., are described and figured in an article in a Russian magazine (*Horæ Societatis Entomologicæ Rossicæ*, Vol. XXXV., Nov., 1900), of which the writer gives the following English abstract: "The observations were made on the Southern coast of the Crimea. The butterfly in repose exactly resembles a dead leaf, just as many tropical *Rhopalocera*, with the famous *Killima* at their head. The circumstance that *Libythea celtis* makes use of its palpi and antennæ for the simulation of a stalk of a leaf is very singular, as no tropical 'leaf-shaped' butterfly does it. The coloration also completely conforms to the habits of the insect. The form of the folded wings, and the presence on the under side of the hind wings of a dark median vein, makes the resemblance to a leaf still more complete. We have thus in this species a unique example of a European butterfly which mimics the dead leaf as perfectly as several celebrated tropical species."—NICHOLAS KUSNEZOW, St. Petersburg.

[The photogravure plate shows three specimens of the butterfly in repose. The resemblance to a dead leaf is complete.]

ERRATUM.—On page 79, third line from bottom, read 1850, instead of 18—.

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